

Shashlik module and PMT test

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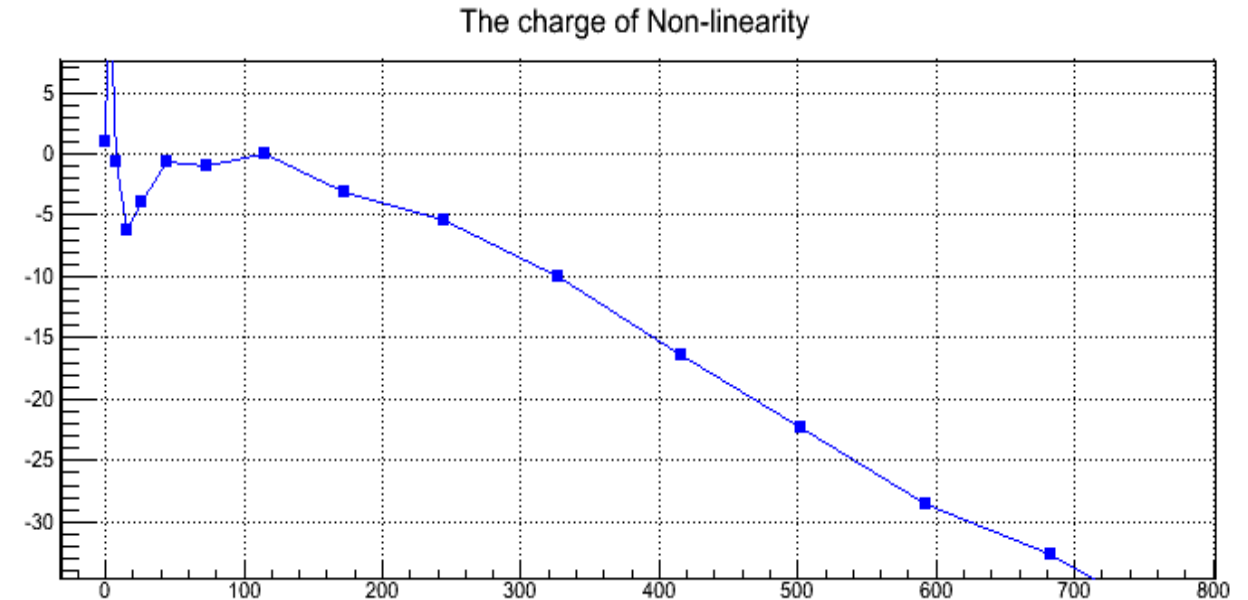
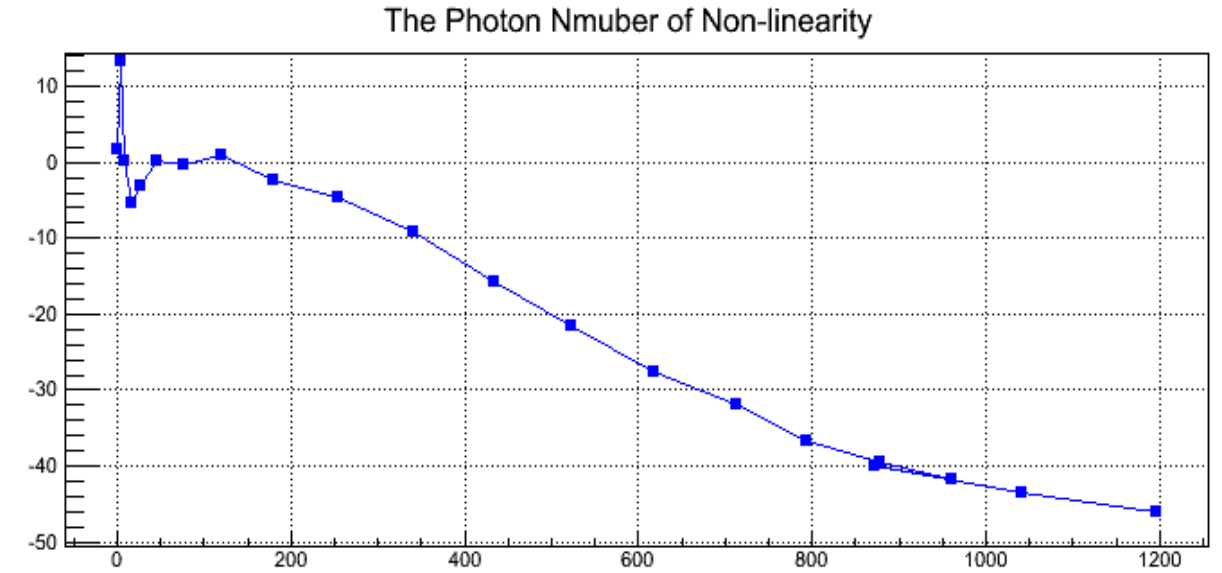
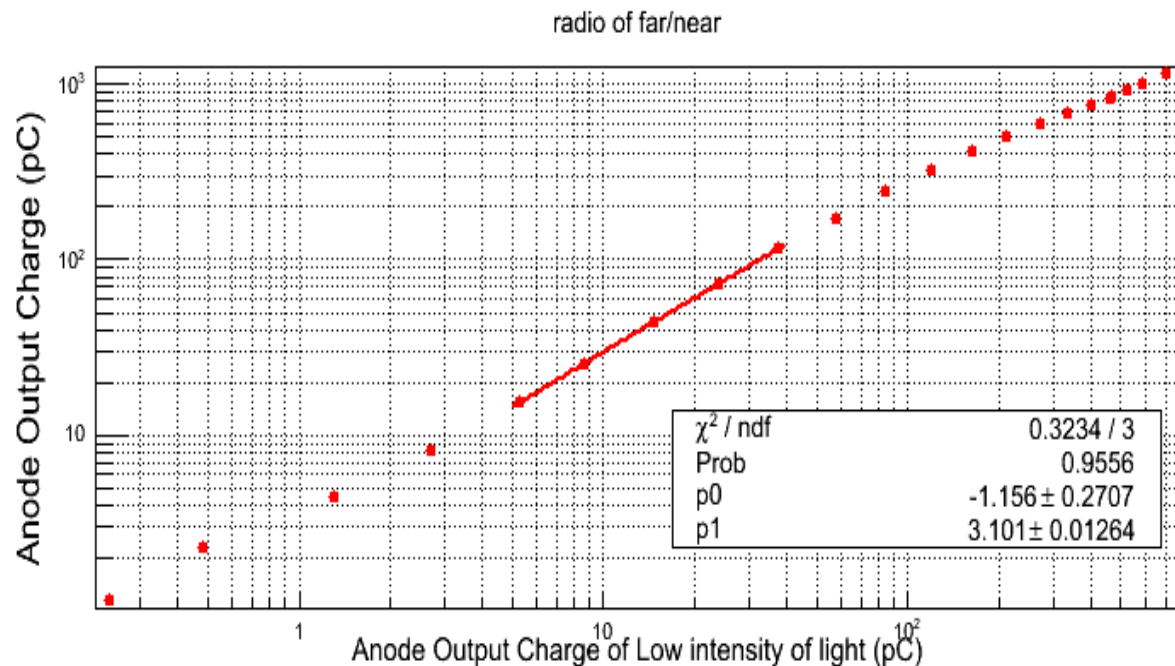
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Outline

1. PMT in THU#2 linearity test
2. THU powder paint test
3. SDU#3 test with higher voltage
4. Shashlik cosmic ray test in JLab

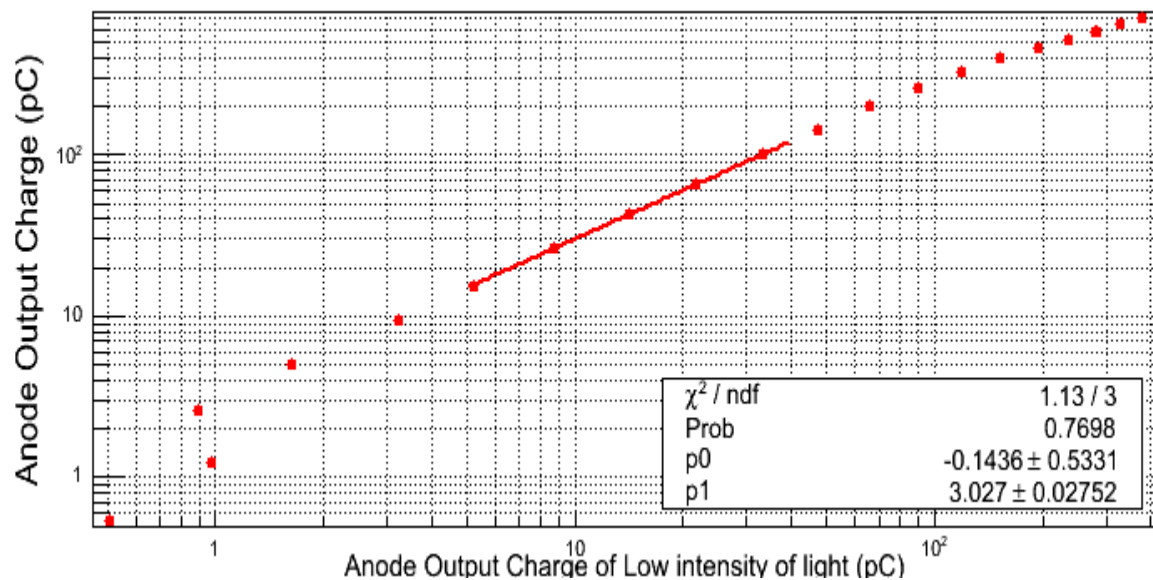
SDU PMT(67748) in THU#2 linearity test(20ns LED pulse)

HV: 1100V(5.997×10^6)

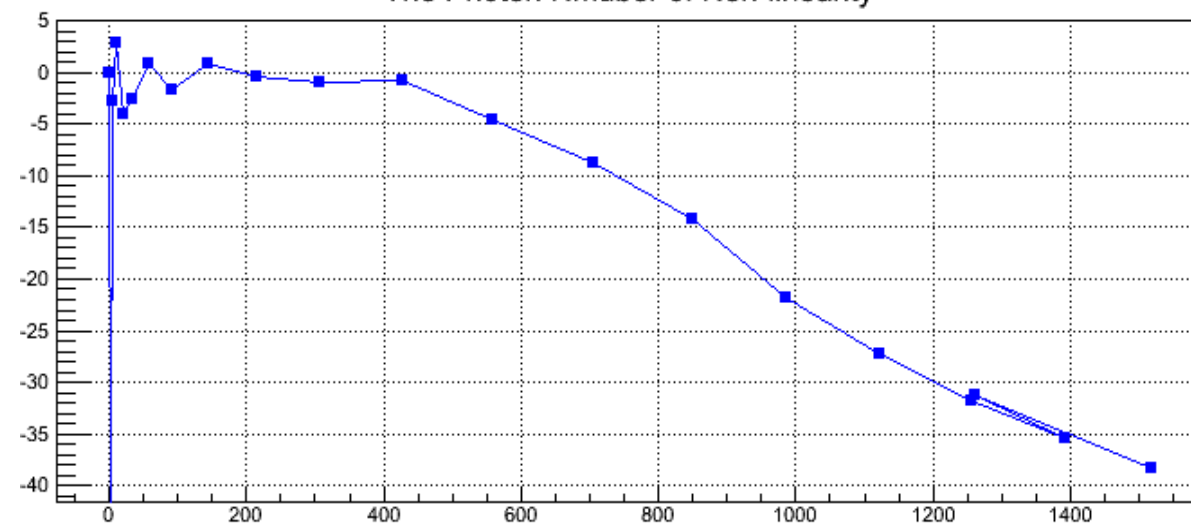


$HV: 1000V(2.9 \times 10^6)$

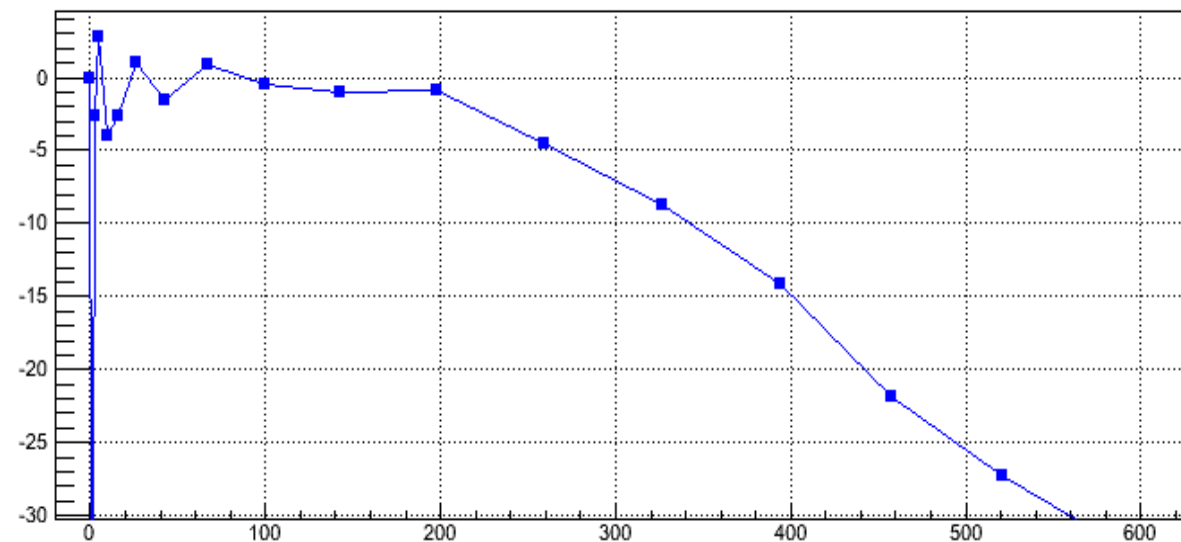
ratio of far/near



The Photon Nmuber of Non-linearity

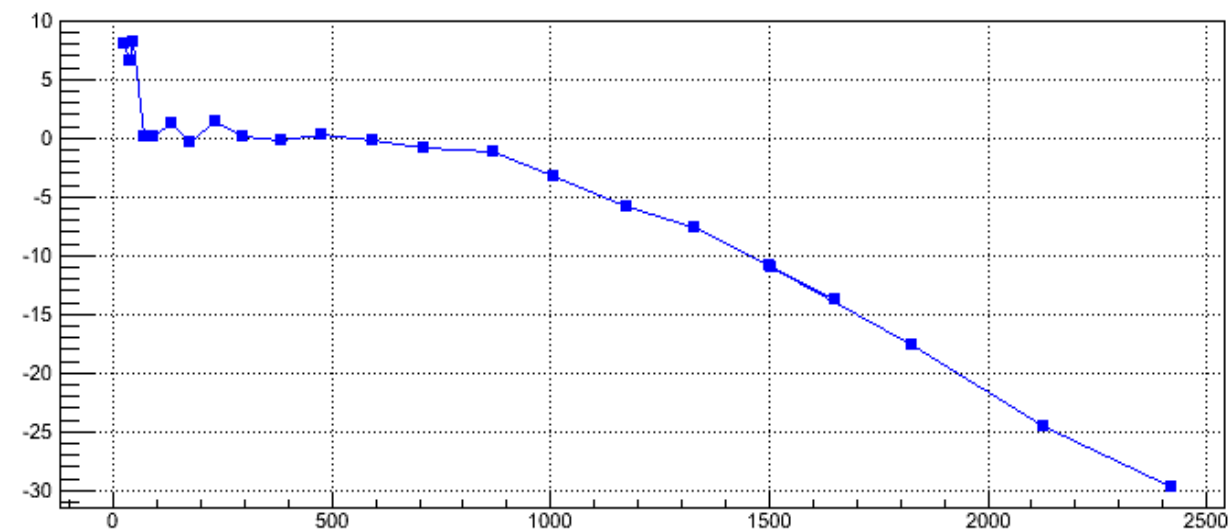


The charge of Non-linearity

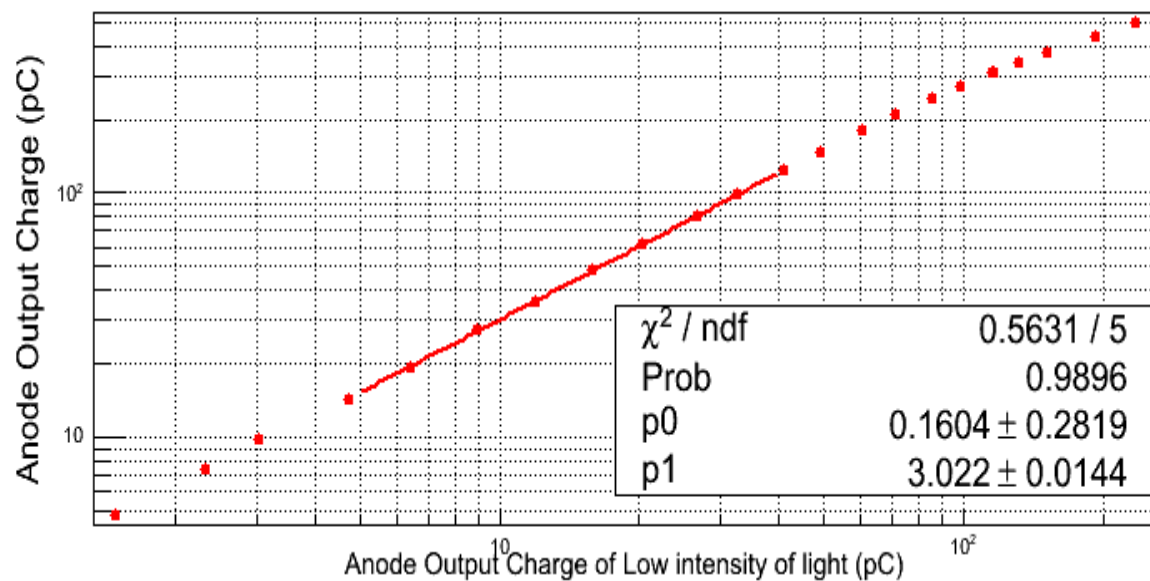


$HV: 900V(1.295 \cdot 10^6)$

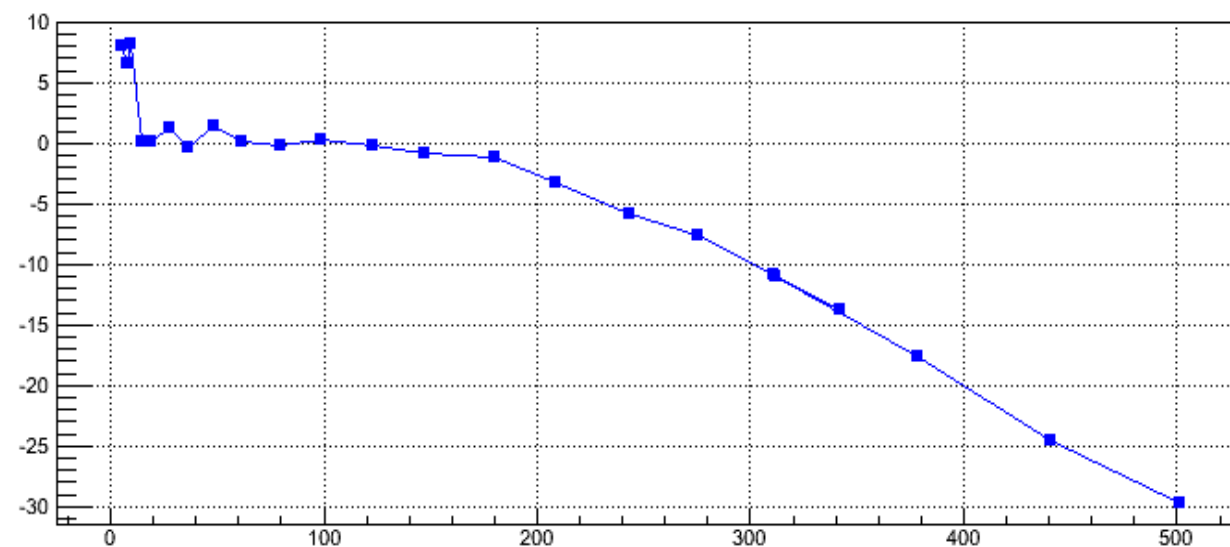
The Photon Number of Non-linearity



ratio of far/near



The charge of Non-linearity



Problems in linearity test:

- All HVs has the max charge 250pC(-5%), the max NPEs are only influenced by the gain
- For 1100V, 300 photon electrons would exceed linearity range, not corresponding to Chendi's result
- The width of LED pulse will influence the linearity range

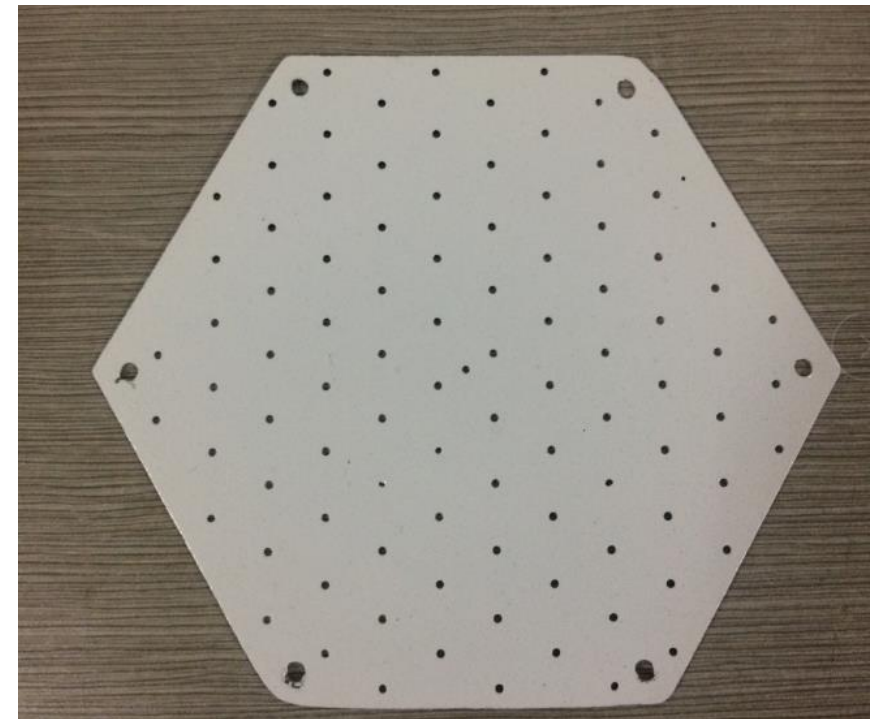
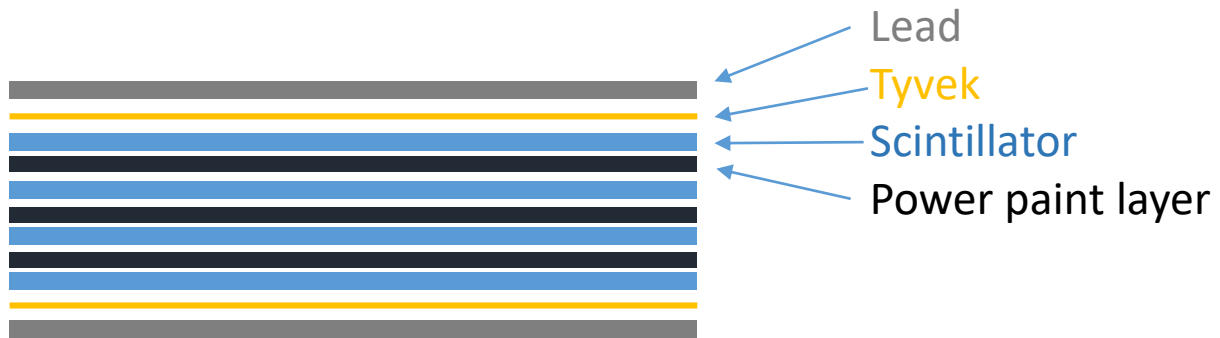
The problems will be check soon

THU powder paint reflectivity test

Receive **three layers of powder** paint from THU, test with similar test setup as previous five layers test(only **4 scintillator layers** in test now).

Test setup

comparing with same setup that only powder paint layer replaced with Tyvek-lead-tyvek



Test Result

Material	PMT	HV(V)	Gain*10^6	Charge	NPE
powder paint	67702	1100	5.40	40.1	46.3
tyvek	67749	1000	5.12	27.8	33.9

Assuming:

Power paint reflectivity =a

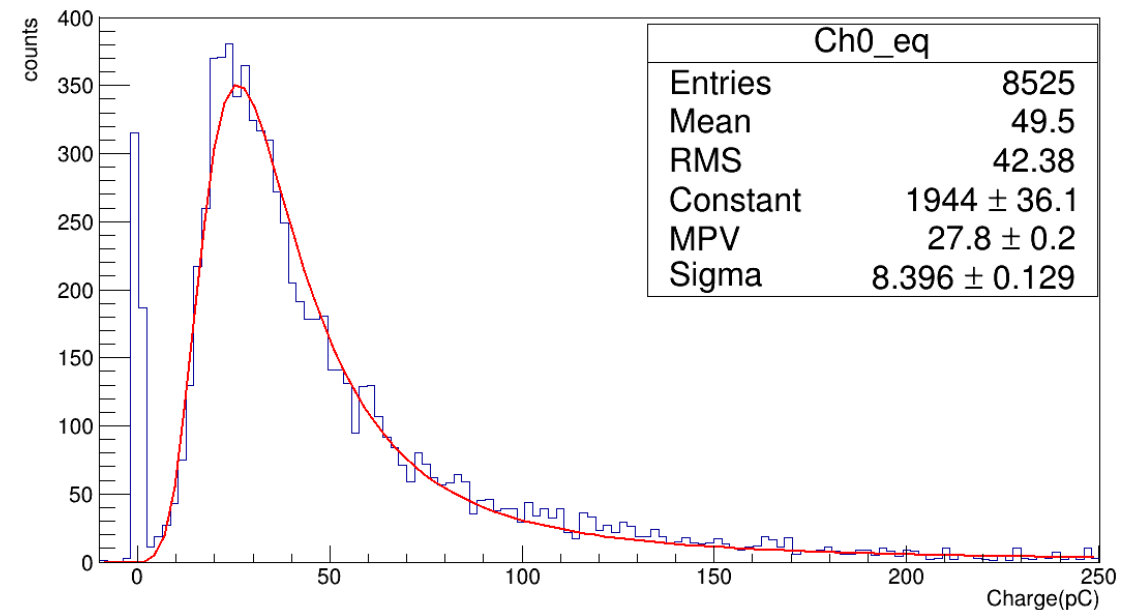
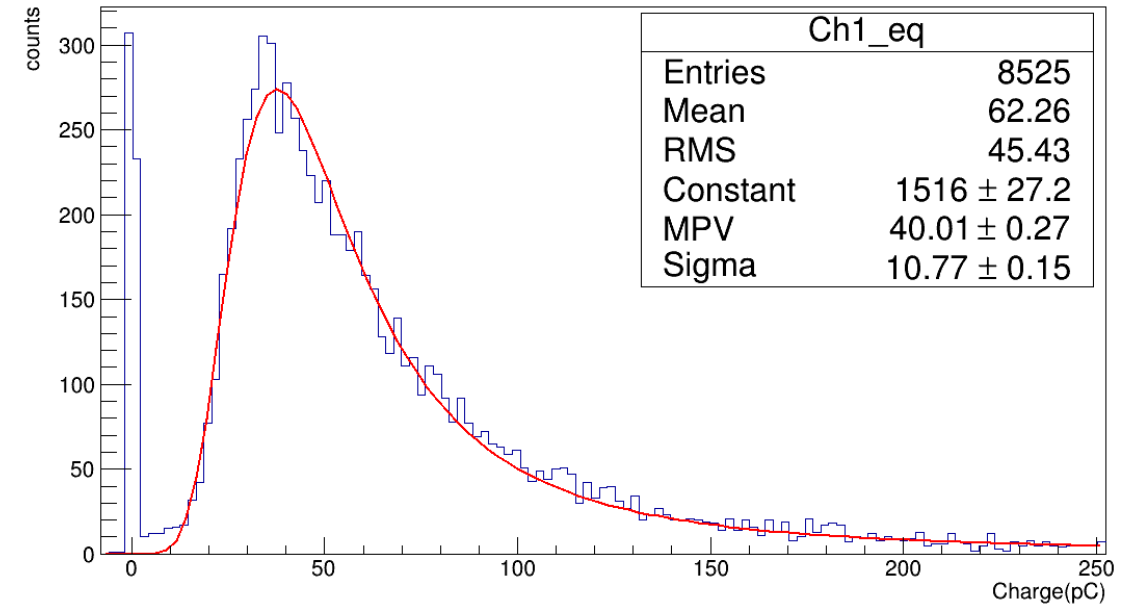
Tyvek reflectivity =b

We get:

$$\frac{2a + 6b}{8a} = \frac{46.3}{33.9}$$

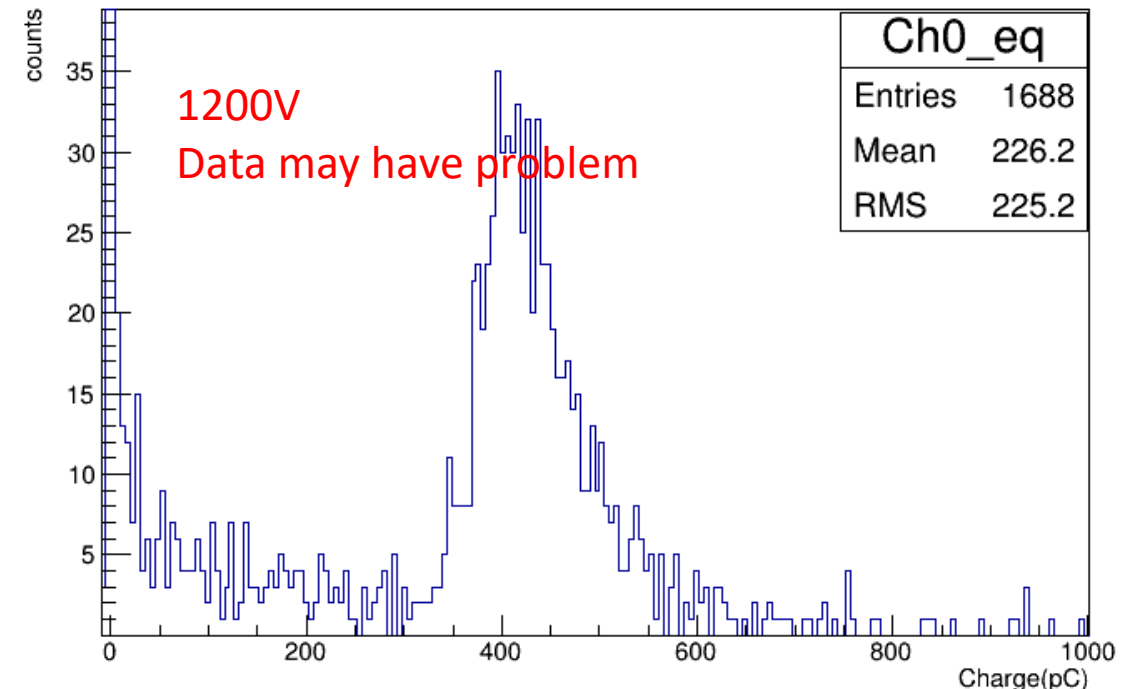
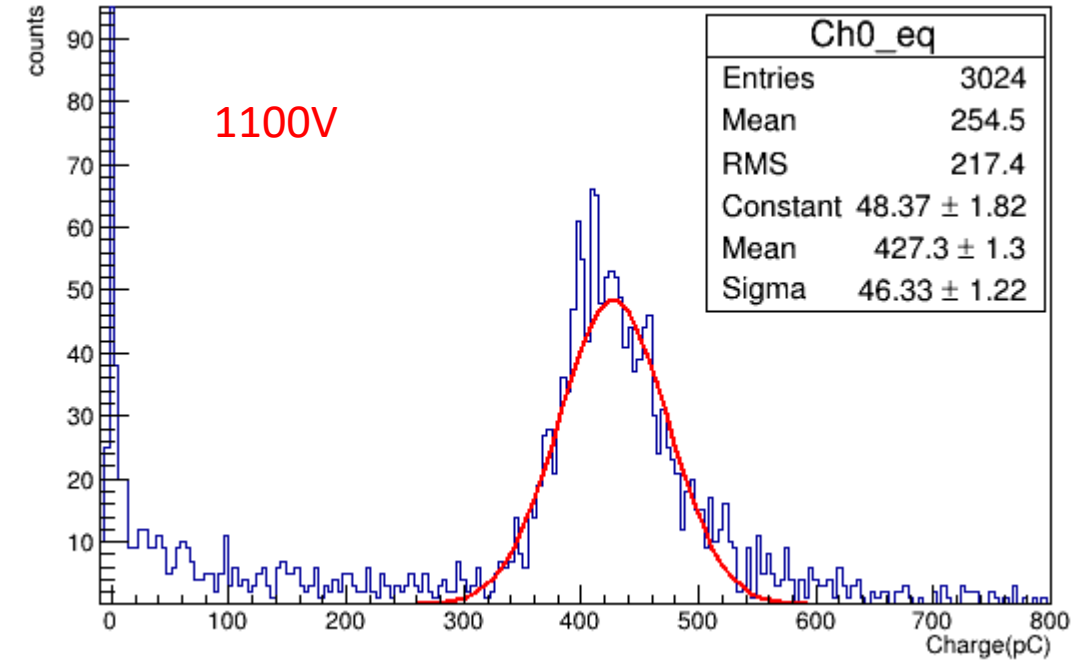
So: b/a = 1.475

Which improve much comparing with SDU modules.



SDU#3 Higher HV test

HV	Gain(*10^6)	Charge(pC)	NPE
900	1.35	106.1	491.2
950	2.01	155.4	483.2
1000	2.93	223.9	477.6
1100	5.4	427.3	494
1200	9.995		



Shashlik signal in JLab cosmic test

Shashlik Module	HV(start from run 1140)	Gain(10^6)
THU	1700	?
SDU#1	1453	5
SDU#2	1294	5

